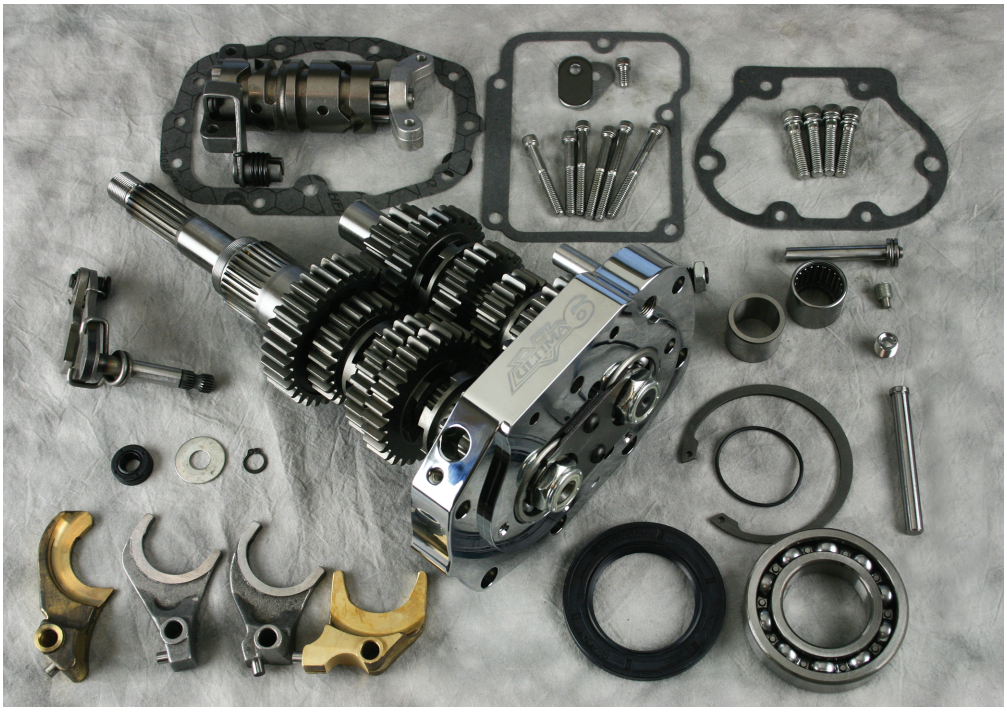
ULTIMA 6 SPEED BUILDERS KIT
#98-902
INSTALLATION INSTRUCTIONS



Ultima recommends that these kits be installed by a trained & qualified mechanic with knowledge of the Harley Davidson style 5-speed transmission.

Ultima 6 speed builders kit should only be installed in a known good transmission case & should be thoroughly inspected during the described conversion process. If transmission housing does not pass inspection Midwest offers replacement 5 spd cases in natural, black & polished finishes.

The Ultima 6 speed builders kit will fit in most OEM & aftermarket transmission housings without modification. However due to some casting variations some modification may be necessary.

If possible, leaving the transmission mounted in the motorcycle frame not only saves time but makes the process easier & helps prevent potential damage to the housing.

Due to variations in neutral switch styles (normally open/normally closed) changing your neutral switch may be required. If shifting from neutral is difficult shimming of the neutral switch may be required.

SPECIAL TOOLS REQUIRED:

- 1990 or later Factory Service Manual
- Retaining ring pliers
- Midwest P/N **97-166** Trans. Main Drive Gear Tool
- Midwest P/N **97-164** Main Drive Gear Bearing/Seal Installer
- Midwest P/N **97-88** Countershaft Sprocket Nut Wrench
- Midwest P/N **97-85** Mainshaft Bearing Race Tool

REV 09/8/14

DISASSEMBLY

For 5 speed gear set removal refer to your factory service manual.

You will need to remove the main drive gear, main drive gear bearings, retaining clip & countershaft needle bearings.

NOTE: Removal of the shifter arm is not necessary for 99 & earlier transmissions.
NOTE: Removal of the shifter arm is necessary for 2000 & later transmissions.

After trans. housing is disassembled thoroughly clean & inspect.

ASSEMBLY

For 2000 & later models removal of approximately 1/4 of an inch off of the shifter arm bushing is likely required. Doing so will allow installation of the retaining clip & washer onto the shifter arm. It is good practice to double check how much material should be removed before cutting the bushing.
See fig. 1 & 2

FIG. 1

Install supplied Main drive gear bearings & countershaft needle bearings using special tool **#97-164**
NOTE: Lightly coat bearings with assembly lube or gear oil for easier installation.

Install supplied Main drive gear retaining clip & verify that it is fully seated and cannot come out.

Do not re-use old bearings or retaining clip.

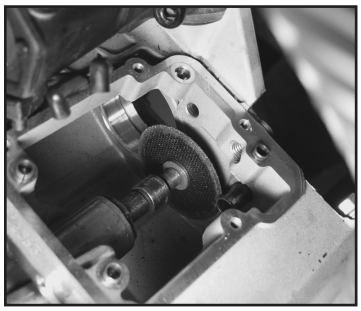


FIG. 2

Install supplied Main drive gear into bearings using special tool **#97-166**
See fig. 3

Install supplied trap door gasket & verify that it is on correctly.

Install supplied 6 speed gear set making sure to align the countershaft with the needle bearing assembly. Slowly slide in gear set until the mainshaft & countershaft will not slide in any further. Lightly tapping on the trap door (while verifying that there is no interference) with a soft blow hammer will then fully seat the shafts & trap door.
See fig. 4

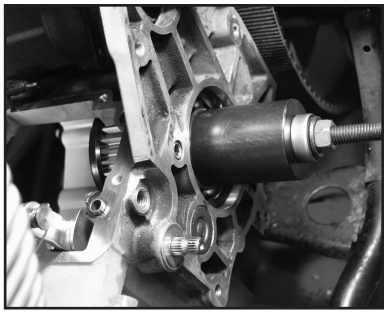
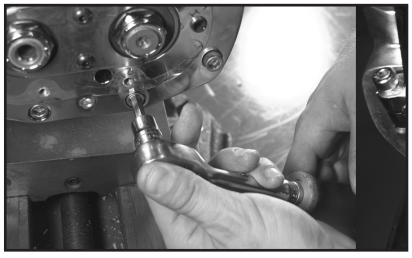


FIG. 3

Once gear set is installed use the supplied 5/16-18x1-1/2 & 1/4-20x1-1/2 bolts to secure the trap door.
Torque the 5/16 bolts to 15 ft-lbs w/ red loctite (high strength)
Torque the 1/4 bolts to 9 ft-lbs w/ red loctite (high strength)
See fig. 5

FIG. 5



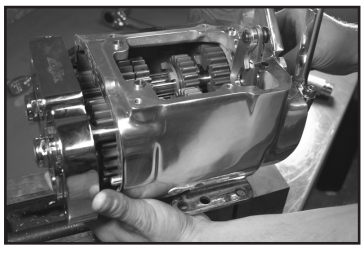


FIG. 4

At this time check to make sure all gears rotate freely & that all slider gears slide with no interference.

Lightly lube & install supplied quad seal onto main drive gear.
See fig. 6

Install Main seal using special tool **#97-164**.
See fig. 7

Install original spacer onto mainshaft.
NOTE: Beveled side goes in towards quad seal.
See fig. 8

Install supplied transmission drain plug & supplied speedo sensor plug with gasket.

Install supplied shifter forks onto appropriate slider gears.
See fig. 9

Lightly lube & install shift fork shafts (short shaft supplied in kit).
NOTE: Short shaft is installed from the right side with the threaded hole facing out. Long shaft is installed from the left side & should not protrude from the right side of case.
See fig. 10

Install shift fork shaft allen head plugs. (Use red loctite to prevent movement of plug & to aid in sealing)
NOTE: Plug on right side will seat fully. To prevent distortion of shift fork shaft torque to 5 ft. lbs (do not overtorque)
Thread the allen head plug on left side until just below flush with housing.
See fig. 11

At this time verify shift forks slide freely on their shafts.

Put gear set in neutral. (no gear dogs mesh/interlock)

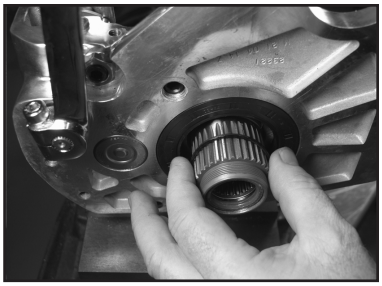


FIG. 6

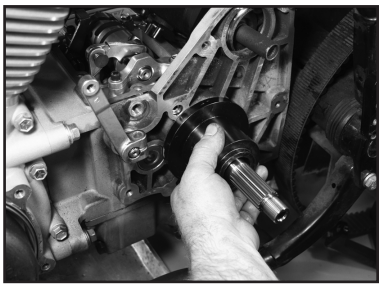


FIG. 7

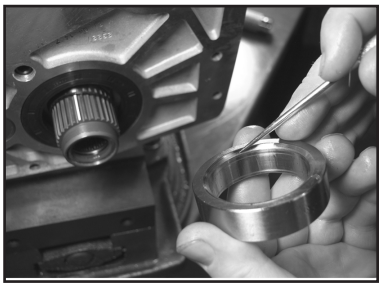


FIG. 8

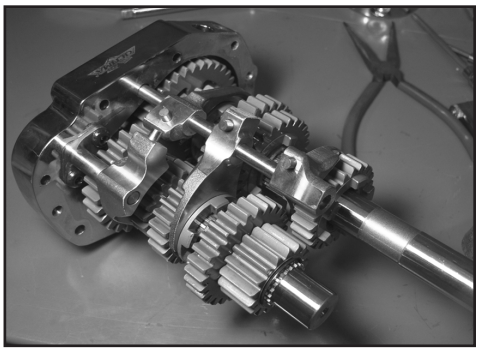


FIG. 9

FIG. 11

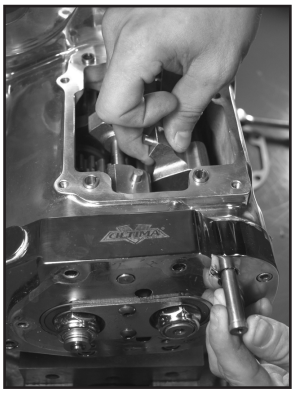


FIG. 10

Install supplied pillow blocks onto shift drum. (Do not lose shims)
NOTE: Lube pillow block bearings.
NOTE: Most drum assemblies only require the .040" shim for proper endplay.
Only use .008" shim if required.
See fig. 12

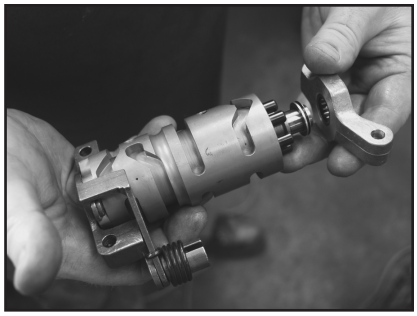


FIG. 12

Install shift drum assembly onto trans. using alignment dowels as a guide.
NOTE: Care must be taken to align shifter fork dowels to shift drum guides.
Putting shifter drum in the neutral position will aid in alignment.
See fig. 13

Once shift drum assembly is fully seated on transmission case bolt down with the original 1/4-20 bolts.
Torque 1/4-20 bolts to 9 ft-lbs using blue loctite (med. Strength).

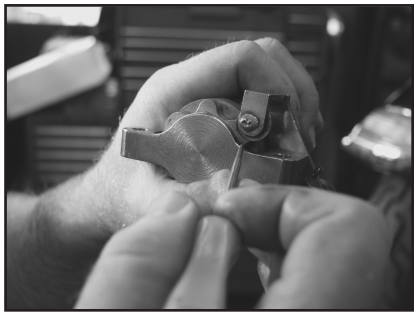


FIG. 13

At this time lift shift detent & shifter pawl arm & verify that the shift drum has free motion & proper endplay (.002"-.010") Shim accordingly.
See fig. 14

Once proper shift drum endplay has been achieved, place transmission in 3rd gear & adjust the pawl assembly so that there is no free play in the downshift motion to 2nd gear. All free play should be in the upshift motion going from 3rd to 4th gear. Once this has been achieved, tighten down the pawl adjusting lock nut.

Install supplied top cover gasket & top cover using the original 1/4-20 bolts.
Torque 1/4-20 bolts to 9 ft-lbs using blue loctite (med. strength).

Install clutch pushrod & supplied throwout bearing. (lightly lube both)
See fig. 15

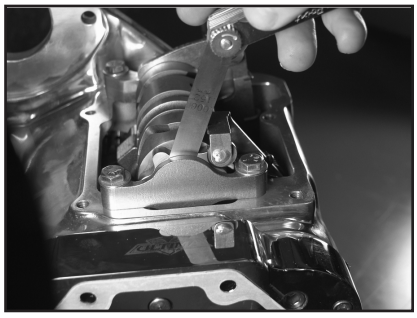


FIG. 14

Install supplied clutch release cover gasket & clutch release cover using supplied 1/4-20 bolts. Torque 1/4-20 bolts to 9 ft-lbs using blue loctite (med. strength).

If required install supplied bearing inner race (wet primary) onto mainshaft using special tool **#97-85**.
NOTE: Open belt primarys (dry primary) do not require a bearing inner race.
See fig. 16

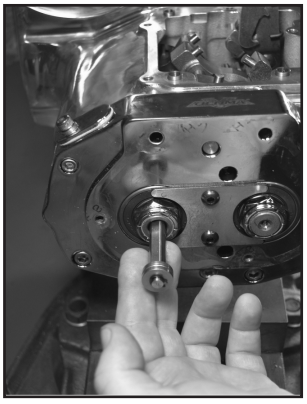


FIG. 15

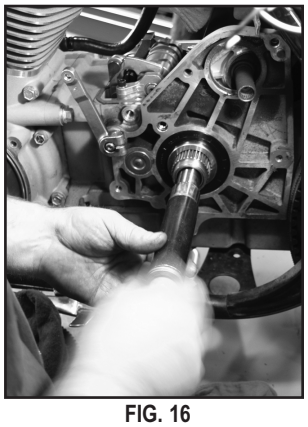


FIG. 16